UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

August 24, 2012

Mr. George H. Gellrich, Vice President
Calvert Cliffs Nuclear Power Plant, LLC
Constellation Energy Nuclear Group, LLC
1650 Calvert Cliffs Parkway
Lusby, Maryland 20657-4702

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT – NRC COMPONENT DESIGN BASES INSPECTION REPORT 05000317/2012007 AND 05000318/2012007

Dear Mr. Gellrich:

On June 21, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Calvert Cliffs Nuclear Power Plant (CCNPP), Units 1 and 2. The enclosed inspection report documents the inspection results, which were preliminarily discussed on June 21, 2012, with Mr. Christopher Costanzo, Plant General Manager, and other members of your staff, and on July 18, 2012, with you and other members of your staff. Following additional in-office review, the final inspection results were presented to you on August 22, 2012.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. In conducting the inspection, the team examined the adequacy of selected components to mitigate postulated transients, initiating events, and design basis accidents. The inspection involved field walkdowns, examination of selected procedures, calculations and records, and interviews with station personnel.

This report documents one NRC-identified finding of very low safety significance (Green). The finding was determined to be a violation of NRC requirements. However, because of the very low safety significance and because it was entered into your corrective action program, the NRC is treating the finding as a non-cited violation (NCV) consistent with Section 2.3.2.a of the NRC's Enforcement Policy. If you contest the NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Senior Resident Inspector at CCNPP.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Docket Room or from the Publicly Available Records component of NRC's document system, Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

Lawrence T. Doerflein

Lawrence T. Doerflein, Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-317, 50-318
License Nos. DPR-53, DPR-69

Enclosure:
Inspection Report 05000317/2012007 and 05000318/2012007
w/Attachment: Supplemental Information

cc w/encl.: Distribution via ListServ

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Sincerely,

/RA/

Lawrence T. Doerflein, Chief
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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos.:	50-317, 50-318
License Nos.:	DPR-53, DPR-69
Report Nos.:	05000317/2012007 and 05000318/2012007
Licensee:	Constellation Energy Nuclear Group, LLC.
Facility:	Calvert Cliffs Nuclear Power Plant, Units 1 and 2
Location:	Lusby, MD
Inspection Period:	May 21 through June 21, 2012
Inspectors:	S. Pindale, Senior Reactor Inspector, Division of Reactor Safety (DRS), Team Leader K. Mangan, Senior Reactor Inspector, DRS E. Keighley, Project Engineer, Division of Reactor Projects M. Patel, Reactor Inspector, DRS S. Kobylarz, NRC Electrical Contractor W. Sherbin, NRC Mechanical Contractor
Approved By:	Lawrence T. Doerflein, Chief Engineering Branch 2 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000317/2012007, 05000318/2012007; 5/21/2012 - 6/21/2012; Calvert Cliffs Nuclear Power Plant, Units 1 and 2; Component Design Bases Inspection.

The report covers the Component Design Bases Inspection conducted by a team of four U.S. Nuclear Regulatory Commission (NRC) inspectors and two NRC contractors. One finding of very low safety significance (Green) was identified. The finding was considered to be a non-cited violation (NCV). The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process (SDP)." Cross-cutting aspects associated with findings are determined using IMC 0310, "Components Within the Cross-Cutting Areas." The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

NRC-Identified Findings

Cornerstone: Mitigating Systems

Green. The team identified a finding of very low safety significance involving a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," in that Constellation did not ensure that design control measures verified or checked the adequacy of design of the containment spray (CS) pump cooling systems. Specifically, the team determined that the seal cooling units installed on the CS pumps would not provide sufficient cooling to the seals, there were discrepancies in the installed configuration of the bearing cooling system for the pumps, and calculations or test results were not available to demonstrate adequate cooling for the pump bearings at design basis accident conditions. Constellation entered these issues into their corrective action program, and performed operability determinations on the cooling systems. Constellation concluded that the systems were operable but degraded.

The finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The team evaluated the finding in accordance with IMC 0609, Significance Determination Process, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," and determined the finding was of very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability or functionality. This finding did not have a cross-cutting aspect because the most significant contributor of the performance deficiency was not reflective of current licensee performance. (Section 1R21.2.1.1)

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21 Component Design Bases Inspection (IP 71111.21)

.1 Inspection Sample Selection Process

The team selected risk significant components for review using information contained in the Calvert Cliffs Nuclear Power Plant (CCNPP) Probabilistic Risk Assessment (PRA) and the U.S. Nuclear Regulatory Commission's (NRC) Standardized Plant Analysis Risk (SPAR) model for CCNPP. Additionally, the team referenced the Risk-Informed Inspection Notebook for CCNPP (Revision 2.1a) in the selection of potential components for review. In general, the selection process focused on components that had a Risk Achievement Worth (RAW) factor greater than 1.3 or a Risk Reduction Worth (RRW) factor greater than 1.005. The components selected were associated with both safety-related and non-safety related systems, and included a variety of components such as pumps, transformers, diesel engines, batteries, and valves.

The team initially compiled a list of components based on the risk factors previously mentioned. Additionally, the team reviewed the previous component design bases inspection reports (05000317/2009006 & 05000318/2009006 and 05000317/2006008 & 05000318/2006008) and excluded the majority of those components previously inspected. The team then performed a margin assessment to narrow the focus of the inspection to 20 components and three operating experience (OE) items. The team selected a main steam isolation valve (MSIV), a containment spray pump, and a letdown isolation valve to review for large early release frequency (LERF) implications. The team's evaluation of possible low design margin included consideration of original design issues, margin reductions due to modifications, or margin reductions identified as a result of material condition/equipment reliability issues. The assessment also included items such as failed performance test results, corrective action history, repeated maintenance, Maintenance Rule (a)(1) status, operability reviews for degraded conditions, NRC resident inspector insights, system health reports, and industry OE. Finally, consideration was also given to the uniqueness and complexity of the design and the available defense-in-depth margins.

The inspection performed by the team was conducted as outlined in NRC Inspection Procedure (IP) 71111.21. This inspection effort included walkdowns of selected components; interviews with operators, system engineers, and design engineers; and reviews of associated design documents and calculations to assess the adequacy of the components to meet design basis, licensing basis, and risk-informed beyond design basis requirements. Summaries of the reviews performed for each component and OE sample are discussed in the subsequent sections of this report. Documents reviewed for this inspection are listed in the Attachment.

.2 Results of Detailed Reviews

.2.1 Results of Detailed Component Reviews (20 samples)

.2.1.1 Containment Spray Pump No. 21

a. Inspection Scope

The team inspected the No. 21 containment spray (CS) pump to verify that it was capable of meeting its design basis requirements. The team reviewed the design requirements of the CS pump, including decay heat removal while shutdown, as well as spray into containment and injection into the vessel during postulated accident conditions. The pump is required to be capable of taking suction from both the refueling water tank and the containment sump. The team reviewed design calculations to verify the adequacy of the pump design. This review included emergency core cooling system calculations to verify that the CS pump was capable of providing the required flow during accident scenarios and that it would have adequate net positive suction head. The team also reviewed a 2009 reasonable expectation for continued operation (RECO) that was developed to show that adequate vortexing limits had been established. Pump test procedures, acceptance criteria, and recent test results were reviewed to verify that pump testing ensured adequate performance under the most limiting conditions. The team also verified the adequacy of cooling to the pump bearings and seal.

In addition, the team reviewed emergency procedures associated with the CS pump to verify that the operators had appropriate direction to ensure the pump and associated spray nozzle system would operate as credited in the accident analysis. The team interviewed system and design engineers to determine if there were any recent issues with the pump or associated support equipment, and performed a field walkdown to evaluate the material condition of the equipment. Finally, the team reviewed corrective action documents to verify deficiencies with the pump were appropriately identified and resolved.

b. Findings

Introduction: The team identified a finding of very low safety significance (Green) involving a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," in that Constellation did not ensure that design control measures verified or checked the adequacy of design of the CS pump cooling systems. Specifically, the team determined that the seal cooling units installed on the CS pumps would not provide sufficient cooling to the seals, there were discrepancies in the installed configuration of the bearing cooling system for the pump, and calculations or tests were not available to demonstrate adequate cooling for the pump bearings at design basis accident conditions.

Description: The team conducted walkdowns of the four CS pumps (two per unit) to evaluate the material condition of the pumps. During the walkdowns, the team noted a pipe coil wrapped around the bearing housing of the pumps. The team noted that the other safety related pumps (low pressure safety injection and high pressure safety injection) in the room had component cooling water supplied to the bearings and seals but the CS pumps did not. The team found that, except for the coil, there was no other external cooling to the pump bearing or seal. The team questioned how heat was removed from these components. Following the walkdown, Constellation informed the team that this pipe coil was a closed loop cooling system used to provide cooling water to the seal and the bearing was cooled by a fan mounted on the shaft of the pump.

In reviewing the installed configuration of the seal cooling system, the team noted the seal vendor manual stated that a heat exchanger to cool the seal must be provided and the seal had notches cut into its rotating portion to provide the motive force for the liquid. The original seal manufacturer's installation, operation, and maintenance instructions stated that cooling water to the seal shall be maintained below a temperature of 140 degrees Fahrenheit (°F). The team requested that Constellation provide information on flow rates through the cooler, temperature data on the system and a basis for concluding the coils were not air bound. Additionally, the team noted that the seal heat exchanger coils were wrapped around the bearing housing (whose temperature could be >150°F), and were located between the motor (temperature >200°F) and pump volute (temperature >200°F). Finally, the team noted that the coils were dirty and had several coats of paint on them which would further limit their heat transfer capability.

Constellation determined that they had no test data or calculations that demonstrated the adequacy of the installed seal cooling system. After discussion with the seal vendor, Constellation concluded that the seal cooler would not work because there would not be adequate flow through the cooler for a variety of reasons, including the potential of air binding at the top portions of the cooling coil. In response, Constellation completed an operability determination. In support of the determination, the seal vendor performed an analysis on the expected conditions the seal would experience during a postulated accident, and concluded that the seal would not fail. This conclusion was based on the limited time the seal would be exposed to water at a temperature above 140°F during a postulated accident. Based on information from the seal vendor, Constellation concluded that the CS pumps were operable but degraded. The team reviewed Constellation's evaluation, and determined the conclusion was reasonable. Constellation entered the issue into the corrective action program by initiating Condition Report (CR) 2012-006102 for additional evaluation and long term resolution.

The team also questioned the adequacy of cooling to the CS pump bearing. The team noted that the design temperature for the room was 110°F and, as with the seal cooling coil, the bearing housing was positioned between the motor and the pump volute. The team also noted that the configuration of the fan shrouds that directed flow onto the bearing from the shaft fans were not the same on all CS pumps, and questioned if enough air was being directed onto the bearing housing. Finally, the team noted that the bearing housings were also dirty and painted. The team asked for calculations and testing data that would demonstrate that adequate cooling would be provided to the bearing housing to ensure that the bearings would not overheat and fail during a design basis accident.

Constellation provided bearing temperatures from two thermocouples mounted in the bearing housing to the team. The data, recorded during outage full-flow testing, showed bearing temperatures were stable and less than 160°F. Additionally, the team noted that the bearing temperature readings for the pump with the fan shroud out of position (on CS pump No. 11) were 10-15°F higher than the other pump bearing temperatures. The team questioned if there was an evaluation that compared the test results taken at reduced pump flow rates and room temperatures to those that would be experienced during a design basis accident. In response to the team's questions, Constellation developed a basis for concluding the maximum oil and bearing temperature would not exceed their design limits during a design basis accident. The team reviewed the supporting analysis and determined the assessment was reasonable. Constellation entered the bearing temperature issues in their corrective action program for evaluation and resolution by initiating CRs 2012-006226 and 2012-005390.

Analysis: The team determined that the failure to verify the adequacy of cooling to the CS pump seal and bearing was a performance deficiency that was reasonably within Constellation's ability to foresee and prevent. The finding was more than minor because it was similar to IMC 0612, Appendix E, "Examples of Minor Issues," Example 3.j, in that the design analysis deficiency resulted in a condition where the team had reasonable doubt regarding the operability of the CS pumps. Additionally, the performance deficiency was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, adequate pump seal cooling had not been verified and an evaluation of the maximum temperatures in the bearing housing during a design basis accident did not exist. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function, and was not the result of any willful violation of NRC requirements.

In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," a Phase 1 SDP screening was performed and determined the finding was of very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability or functionality of the pump. This finding did not have a cross-cutting aspect because the most significant contributor of the performance deficiency was related to the initial installation of the pumps and, therefore, was not reflective of current performance.

Enforcement: 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that design control measures shall provide for verifying or checking the adequacy of design, such as by performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. Contrary to the above, prior to June 21, 2012, Constellation had not evaluated the adequacy of the design of the seal cooling system or bearing cooling system for the CS pumps to demonstrate that adequate cooling was available to the components during design basis events. In response, Constellation entered the issues in their corrective action program, evaluated the seal and bearing configurations, and determined that the CS pumps were operable but degraded. Because this violation was of very low safety significance (Green) and has been entered into Constellation's corrective action program (CRs 2012-006102, 2012-006226, and 2012-005390), this violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000317/2012007-01, 05000318/2012007-01, Inadequate Cooling Verification for Containment Spray Pumps)**

.2.1.2 Turbine-Driven Auxiliary Feedwater Pump, AFW-P11

a. Inspection Scope

The team inspected the No. 11 turbine driven auxiliary feedwater (TDAFW) pump to verify that it was capable of meeting its design basis requirements. The auxiliary feedwater (AFW) pumps provide emergency feedwater to the steam generators in response to transient and accident events. The team reviewed analyses, procedures, and test results associated with operation of the AFW pumps under postulated transient, accident, and station blackout conditions. The analyses included hydraulic performance, net positive suction head, room heat-up during loss of ventilation, and potential for vortexing at the suction source. Seismic design documentation was reviewed to verify pump design was consistent with limiting seismic conditions. The team also evaluated the pump suction alarm setpoint to verify that it had an adequate basis. In-service testing (IST) results were reviewed to verify acceptance criteria were met and performance degradation would be identified, taking into account set-point tolerances and instrument inaccuracies.

The team reviewed Constellation's responses and actions to NRC Bulletin 88-04, "Potential Safety-Related Pump Loss," to assess implementation of operating experience related to pump minimum flow, and pump-to-pump interaction. The team conducted a detailed walkdown of the pump to assess the material and environmental conditions, and to verify that the installed configuration was consistent with system drawings, and the design and licensing bases. In addition, the team interviewed system and design engineers to discuss recent CRs and maintenance history for the pump in order to determine the overall condition of the pump, and to verify deficiencies were appropriately identified and resolved.

Finally, the team reviewed the adequacy of tornado missile protection for exterior steam exhaust pipes for the AFW turbine. Specifically, the team reviewed Constellation actions to implement the use of PRA, as permitted in an NRC Safety Evaluation Report (SER) dated May 1995, for determining whether installed equipment used to safely shutdown the plant in the event of a tornado needs to be protected by physical barriers. The team also reviewed Constellation actions documented in CRs 2012-006207, 2012-005506, and 2012-006009, which included updating the aggregated PRA evaluation with potential tornado missile targets identified during the inspection to ensure licensing requirements were met.

b. Findings

No findings were identified.

.2.1.3 Containment Sump Isolation Valve, 1-MOV-4145

a. Inspection Scope

The team inspected containment sump isolation motor-operated valve (MOV), 1-MOV-4145, to determine if it was capable of performing its design function. The team reviewed the UFSAR, the Technical Specifications (TS), and design basis documents to determine the design and licensing bases for the valve. The team interviewed system and design engineers to ensure appropriate assumptions had been used in valve design calculations. The valve capability calculations and analyses were reviewed by the team to verify that the thrust and torque limits and actuator settings were correct and based on appropriate design conditions, such as maximum expected differential pressures. Additionally, the team reviewed associated IST and diagnostic testing results to ensure valve performance was being monitored in accordance with IST program requirements. The team reviewed the valve operating logic circuits and completed surveillance test results to verify valve controls would function to provide the desired response to a recirculation activation signal. The team also reviewed electrical voltage calculations to verify the motor would have adequate voltage when required to reposition during postulated design basis accidents. Corrective action documents were reviewed to verify deficiencies were appropriately identified and resolved. Finally, a walkdown was conducted to assess the material condition of the valve and to verify that the installed configuration would support its design basis function under transient and postulated accident conditions.

b. Findings

No findings were identified.

.2.1.4 Low Pressure Safety Injection Flow Control Valve, 2CV306

a. Inspection Scope

The team inspected the low pressure safety injection (LPSI) flow control valve, 2CV306, to verify that it was capable of supporting the design basis requirements of the LPSI system. The UFSAR, the TSs, and design basis documents were reviewed to determine the design and licensing bases for the valve. The team reviewed operating procedures for both transient and accident conditions to determine if the valve was being operated in accordance with accident analysis assumptions. The team reviewed the valve and actuator specification/design sheets to ensure the valve installed in the field was consistent with the design. The team reviewed thrust capability calculations associated with the valve to ensure the valve actuator was capable of providing the required thrust for both the open and closed positions. The team also reviewed associated IST and diagnostic testing results to ensure valve performance was being monitored in accordance with IST program requirements. The team verified that there were no active mechanical or electrical single failure conditions that could cause an inadvertent closure of the valve. The team also reviewed the motive force for the valve actuator through a walkdown of the valve and its associated air system supply to determine if the air supply would be available for operation when required, and that the valve would reposition to its required accident position in the event of a loss-of-air event. Finally, the team interviewed system and design engineers to discuss recent condition reports and maintenance history for the valve in order to determine the overall condition of the valve, and to verify deficiencies were appropriately identified and resolved.

b. Findings

No findings were identified. See Section 4OA5 of this report for additional discussion on a previously identified Unresolved Item associated with this component.

.2.1.5 Letdown Isolation Valve, 1CV516

a. Inspection Scope

The team inspected the letdown isolation valve, 1CV516, to verify that it was capable of performing its design basis function. The UFSAR, the TSs, and design basis documents were reviewed to determine the design and licensing bases for the valve. The team reviewed operating procedures for both transient and accident conditions to determine if the valve was being operated in accordance with accident analysis assumptions. The team reviewed local leak rate testing procedures and results to verify the valve would be able to perform its containment isolation function. The team also reviewed the valve actuator and its associated air system supply to determine if the air supply would be available for operation when required, and to ensure that the valve would reposition to its required accident position in the event of a loss-of-air event. Finally, the team interviewed system and design engineers to discuss recent condition reports and maintenance history for the valve in order to determine the overall condition of the valve, and to verify deficiencies were appropriately identified and resolved.

b. Findings

No findings were identified.

.2.1.6 Emergency Diesel Generator 2B Support Systems

a. Inspection Scope

The team inspected the '2B' EDG to verify that its mechanical support systems were capable of meeting their design basis functions. The team's review included the subsystems, such as fuel oil, starting air, engine cooling, and room cooling. The team reviewed the fuel oil consumption calculation to ensure the quantity of oil on site was consistent with design and licensing requirements. Recent fuel oil chemistry sample results were reviewed to ensure oil quality was within specifications. Engine air start system check valve leakage testing was reviewed to ensure engine starting capability from the stored air supply was available. The team reviewed engine heat exchanger design calculations and recent service water flow balance tests to ensure adequate cooling water flow rate was maintained. Room cooling calculations were reviewed to ensure sufficient ambient air flow was maintained in the EDG room to remove engine and generator heat loads. The team also performed walkdowns of the EDG to assess the material condition, and observe seismic and tornado design features. Finally, corrective action documents and system health reports were reviewed to verify deficiencies were appropriately identified and resolved, and that the EDG was properly maintained.

b. Findings

No findings were identified.

.2.1.7 Service Water Intake Structure

a. Inspection Scope

The safety-related function of the intake structure is to provide the structural support and environmental protection necessary to ensure the functional integrity of the safety-related saltwater pumps, which take water from the ultimate heat sink (Chesapeake Bay). The team performed several detailed walkdowns of the intake structure, and reviewed design analyses to ensure that the structure would remain intact during design basis events. The review focused on the potential for damage to the intake structure caused by barge impact, a seismic event, tornado missiles, and both internal and external flooding events. Corrective action documents were reviewed to verify deficiencies with the structure were appropriately identified and resolved.

b. Findings

No findings were identified.

.2.1.8 Instrument Air Compressor, No. 22

a. Inspection Scope

Air compressor No. 22 is non-safety related, and provides plant air for normal operation. The compressor was a significant contributor to plant risk due to the probability of a plant trip on loss of instrument air. The team performed a walkdown to observe material condition of the air compressor. Recent overhaul records were reviewed to determine whether components were being replaced and maintained as necessary. Compressor on and off cycling was observed to determine whether there were significant air leaks in the system. The team also reviewed corrective action documents and system health reports to verify deficiencies with the compressor were appropriately identified and resolved.

b. Findings

No findings were identified.

.2.1.9 Condensate Storage Tank No. 12

a. Inspection Scope

The team reviewed the design, testing, inspection, and operation of the condensate storage tank (CST), and associated tank level instruments, to evaluate whether it could perform its design basis function as the preferred water source for the auxiliary feedwater pumps. Specifically, the team reviewed design calculations, drawings, and vendor specifications, including tank sizing, level uncertainty analysis, and pump vortex calculations to evaluate the adequacy and appropriateness of design assumptions and operating limits.

The team interviewed system and design engineers, and reviewed instrument test records and tank inspection procedures to determine whether maintenance and testing were adequate to ensure reliable operation, and to evaluate whether those activities were performed in accordance with regulatory requirements, industry standards, and vendor recommendations. The team also reviewed results of recent external visual inspections of the CST, and conducted a walkdown of the tank area to independently assess the material condition of the CST and associated instrumentation. Finally, the team reviewed corrective action documents and system health reports to determine if there were any adverse trends associated with the CST, and to assess Constellation's capability to evaluate and correct problems.

b. Findings

No findings were identified.

.2.1.10 Main Steam Isolation Valve, 1CV4043

a. Inspection Scope

The team inspected the No. 11 main steam isolation valve (MSIV), 1CV4043, to verify the valve was capable of performing its design basis function. The MSIV is an air operated valve that closes to prevent the unrestricted release of steam from the steam generators in the event of an upstream steam line rupture and to isolate the steam generator in the event of a loss-of-coolant accident, steam generator tube rupture, or downstream steam line rupture. The valve is normally open and fails closed on loss of control or actuation power, and may be actuated manually.

The team reviewed the UFSAR, the TSs, the TS Bases, and the IST basis documents to identify the design basis requirements of the valve. The team reviewed drawings, operating and maintenance procedures, and completed maintenance and modification records to verify the MSIV safety function was maintained. The team reviewed valve testing procedures and stroke timing data to verify acceptance criteria were adequate and that performance was not degrading. The team discussed design, operation, and component history with engineering and operations staff to evaluate performance history and overall component health. The team also conducted a walkdown of the MSIV to assess its material condition and to verify the installed configuration was consistent with plant drawings, procedures, and the design bases. Finally, the team reviewed corrective action documents to verify Constellation was identifying and correcting issues with the MSIV, and to verify there were no adverse trends.

b. Findings

No findings were identified.

.2.1.11 Component Cooling Water Heat Exchanger Saltwater Outlet Valve, 1CV5208

a. Inspection Scope

The team inspected the component cooling water heat exchanger saltwater normal outlet valve, 1CV5208, to verify that it was capable of meeting its design basis function of staying open to ensure saltwater supply is not interrupted through the heat exchangers following a safety injection actuation signal.

The team reviewed the UFSAR, the TSs, the TS Bases, and the IST basis documents to identify the design basis requirements of the valve. The team reviewed drawings, operating and maintenance procedures, and completed maintenance records to verify the safety function was maintained. The team reviewed valve testing procedures and IST results, including stroke time, to verify acceptance criteria were adequate and that performance was not degrading. The team discussed design, operation, permanent modifications, and component history of the valve with engineering and operations staff to evaluate performance history and overall component health. The team also conducted a walkdown of the valve to assess its material condition and to verify the installed configuration was consistent with plant drawings, procedures, and the design basis. Finally, the team reviewed corrective action documents to verify Constellation was identifying and correcting issues with the valve, and to verify there were no adverse trends.

b. Findings

No findings were identified.

.2.1.12 Auxiliary Feedwater Pump No. 13 Automatic Recirculation Valve, 1CKVAFW183

a. Inspection Scope

The team inspected the No. 13 auxiliary feedwater (AFW) pump automatic recirculation valve to verify the valve was capable of performing its design basis function. The valve, located in the AFW pump discharge piping, opens to provide a flow path from the No. 13 motor-driven AFW pump to the steam generators. The valve also closes to prevent backflow through an idle motor-driven pump when the TDAFW pumps are operating. The valve is internally ported to the recirculation header via a pilot valve assembly to ensure minimum pump flow.

The team reviewed the UFSAR, the TSs, the TS Bases, and the IST basis documents to identify the design basis requirements of the valve. The team reviewed drawings, operating and maintenance procedures, and completed maintenance records to verify the safety function was maintained. The team reviewed valve testing procedures and test results to verify acceptance criteria were adequate and that performance was not degrading. The team discussed the design, operation, and component history of the valve with engineering and operations staff to evaluate performance history and overall component health. The team also conducted a walkdown of the valve to assess its material condition and to verify the installed configuration was consistent with plant drawings, procedures, and the design basis. Finally, the team reviewed corrective action documents to verify Constellation was identifying and correcting issues with the valve, and to verify there were no adverse trends.

b. Findings

No findings were identified.

.2.1.13 Switchyard Direct Current Power

a. Inspection Scope

The team inspected the station switchyard direct current (DC) power system to verify that it was capable of meeting its design basis requirements. The switchyard DC power system is designed to provide 125Vdc power for the operation of the switchyard breakers, relaying and communications equipment. The team reviewed the switchyard battery and charger sizing calculations, as well as the surveillance testing results, that demonstrated the battery capacity was adequate for 24 hours of equipment operation for a loss of switchyard alternating current (AC) auxiliary power. The team reviewed the one-line diagrams for the switchyard DC and AC auxiliary power distribution systems, and the battery and charger vendor nameplate rating data for conformance with the design basis. Finally, the team reviewed corrective action documents to verify Constellation was identifying and correcting issues with the battery and charger, and to verify there were no adverse trends.

b. Findings

No findings were identified.

.2.1.14 13kV Voltage Regulator, 1H1102REG

a. Inspection Scope

The team inspected the 13kV voltage regulator 1H1102 to verify that it was capable of meeting its design basis requirements. The voltage regulator was designed to maintain adequate voltage to the service transformer for 4kV Unit Buses 11, 12, 13, and 14. The team reviewed the load flow calculation and the equipment vendor ratings for conformance with design basis. Walkdowns at the voltage regulator were performed to assess the observable material condition. Also, the team reviewed operating procedures and completed preventive maintenance procedures to verify the voltage regulator was operated and maintained as designed. Finally, the team reviewed corrective action documents to verify Constellation was identifying and correcting issues with the voltage regulator, and to verify there were no adverse trends.

b. Findings

No findings were identified.

.2.1.15 Station Blackout Diesel Generator

a. Inspection Scope

The team inspected the station blackout (SBO) Diesel Generator (DG), to verify that it was capable of meeting its design basis requirement for load capability. The team reviewed maintenance records to verify Constellation performed adequate electrical preventive maintenance to ensure reliable SBO DG operation. The SBO DG is designed to provide standby power to safety-related 4kV Unit Bus 11, 14, 21, or 24 when both the preferred power supply and the emergency diesel generator standby power supply are not available. The team reviewed the one-line diagrams for the SBO DG and the station 4kV unit buses, and the vendor nameplate rating data for the SBO DG for conformance with the design basis. The team reviewed the setpoint basis for devices that can automatically trip the DG during SBO conditions and the maintenance testing performed on the devices. The team reviewed the load capability of the SBO DG for the environmental conditions related to the installation. Specifically, the team reviewed the SBO DG building temperature range and profile to assess the potential impact on combustion air and the effect on DG load capability. The team also conducted walkdowns of the SBO DG to evaluate the material condition, and to observe the operating environment during post-maintenance load testing for indications of degradation of equipment. Finally, the team reviewed corrective action documents to verify Constellation was identifying and correcting issues with the SBO DG, and to verify there were no adverse trends.

b. Findings

No findings were identified.

.2.1.16 120Vac Inverter, 1Y01A

a. Inspection Scope

The team inspected 120Vac vital inverter 1Y01A to verify that it was capable of meeting its design basis requirements. The inverter is designed to provide power to safety-related loads that include the nuclear instrumentation, reactor protection, and the engineered safety features actuation systems. The team reviewed the loading documentation that determined the design basis for maximum load, and the inverter equipment vendor ratings for conformance with design basis. The team also reviewed a calculation that was provided to demonstrate the inverter provided the 120Vac system loads with adequate voltage for design basis conditions. The team also reviewed a common mode failure analysis and the inverter qualification testing that was performed to demonstrate adequate clearing for the 120Vac system branch circuit fuses during fault conditions. Walkdowns at the inverter were conducted to assess the observable material condition and to verify that the installation was in accordance with manufacturer instructions. The team also reviewed the operating and surveillance procedures to verify 120Vac system voltage limits were correctly incorporated. Finally, the team reviewed corrective action documents to verify Constellation was identifying and correcting issues with the inverter, and to verify there were no adverse trends.

b. Findings

No findings were identified.

.2.1.17 Saltwater Pump No. 11 Motor

a. Inspection Scope

The team inspected the No. 11 saltwater (SW) pump motor to determine whether it could fulfill its design basis function of providing adequate horsepower for the pump to deliver the required cooling water flow to safety-related loads. The team walked down the SW pump, the pump motor, and the pump house to assess the observable material condition for the pump motor and the operating environment. The team reviewed the SW pump performance curve and design basis flow requirement to evaluate the required capacity for the break horsepower required by the pump during design basis conditions. The team reviewed the 4160Vac system load flow calculation and motor nameplate data to confirm that adequate voltage would be available at the motor terminals for design basis conditions. The team also reviewed the motor overcurrent relay setting calculation, relay settings, and recent overcurrent relay calibration tests to evaluate whether the protective relays would provide for reliable motor operation at design basis minimum voltage conditions. Finally, the team reviewed corrective action documents to verify Constellation was identifying and correcting issues with the motor, and to verify there were no adverse trends.

b. Findings

No findings were identified.

.2.1.18 No. 13 Component Cooling Water Pump Motor, 1MB116

a. Inspection Scope

The team inspected the No. 13 component cooling water pump motor to verify it could respond to all design basis events. The team conducted a walkdown of the associated pump and motor to assess the material condition of the equipment. The team reviewed inspection and testing procedures to verify that appropriate preventive maintenance and surveillance activities were being performed. A sample of CRs was reviewed to assess the adequacy of corrective actions taken to address identified deficiencies. The team reviewed design documents and drawings to evaluate the ability of the pump motor to perform its design function. The team interviewed the system engineer regarding the maintenance and operation of the pump and associated breaker to determine overall component health. Finally, the team reviewed the AC load flow studies to verify that adequate voltage would be available at the pump motor for all design conditions.

b. Findings

No findings were identified.

.2.1.19 No. 11 High Pressure Safety Injection Pump Motor, 1MA108

a. Inspection Scope

The team inspected the No. 11 high pressure safety injection pump motor to verify it could respond to all design basis events. The team conducted a walkdown of the associated pump and motor to assess the material condition of the equipment. The team reviewed inspection and testing procedures to verify that appropriate preventive maintenance and surveillance activities were being performed. A sample of CRs was reviewed to assess the adequacy of corrective actions taken to address identified deficiencies. The team reviewed design documents and drawings to evaluate the ability of the pump motor to perform its design function. The team interviewed the system engineer regarding the maintenance and operation of the pump and associated breaker to assess overall component health. Finally, the team reviewed the AC load flow studies to verify that adequate voltage would be available at the pump motor for all design conditions.

b. Findings

No findings were identified.

.2.1.20 4160 Vac Emergency Bus 11, 1BUS1A01

a. Inspection Scope

The team reviewed 4160 Vac emergency bus No. 11 to verify it could perform its design function of supporting its required loads under worst case accident loading and grid voltage conditions. The team reviewed the AC load flow calculations to confirm that there was adequate voltage at all safety-related equipment under postulated accident conditions concurrent with allowable grid voltage ranges. The team reviewed degraded voltage relay setpoint calculations, motor starting and running voltage calculations, and motor control center control circuit voltage drop calculations. The team reviewed protective relaying schemes and calculations to determine whether equipment such as motors and cables were adequately protected, and to determine whether protective devices featured proper selective tripping coordination. Maintenance procedures and schedules were reviewed to determine whether they reflected up to date vendor technical data and whether equipment was being properly maintained. The team reviewed corrective action documents and maintenance records to determine whether there were any adverse operating trends. The team reviewed operating procedures to determine whether the limits and protocols for maintaining offsite voltage were consistent with design calculations. Finally, the team performed a visual inspection of the 4160 Vac emergency bus No. 11 to assess material condition and the presence of potential hazards.

b. Findings

No findings were identified.

.2.2 Review of Industry Operating Experience and Generic Issues (3 samples)

The team reviewed selected OE issues for applicability at the Calvert Cliffs Nuclear Power Plant. The team performed a detailed review of the OE issues listed below to verify that Constellation had appropriately assessed potential applicability to site equipment and initiated corrective actions when necessary.

.2.2.1 NRC Information Notice 2010-25, Inadequate Electrical Connections

a. Inspection Scope

The team evaluated Constellation's applicability review and disposition of NRC Information Notice (IN) 2010-25. The IN was issued to inform licensees about operating experience regarding inadequate electrical connections that were caused by a variety of deficient maintenance practices. The team assessed Constellation's evaluation, which included a review of their barrier analysis, and station practices and procedures to ensure electrical connections were properly reassembled after maintenance, and periodically verified tight and with low electrical resistance consistent with vendor requirements. The inspection included a review of corrective action documents, interviews with engineering and maintenance personnel, and plant walkdowns. The team verified that Constellation considered all configurations and voltage levels of electrical connections as described in the IN.

b. Findings

No findings were identified.

.2.2.2 NRC Information Notice 2006-22, New Ultra-Low-Sulfur Diesel Fuel Oil Could Adversely Impact Diesel Engine Performance

a. Inspection Scope

The team reviewed Constellation's review of NRC IN 2006-22. At the time of the inspection, the site continued to receive low-sulfur diesel fuel oil, and, therefore, has not implemented changes associated with switching to ultra-low-sulfur diesel fuel oil. The team also reviewed administrative program controls, including chemistry sampling requirements and associated acceptance criteria, to verify that Constellation could ensure continued receipt and usage of low-sulfur diesel fuel oil.

b. Findings

No findings were identified.

.2.2.3 NRC Information Notice 2007-18, Operating Experience Regarding Entrainment of Gas or Debris into Auxiliary Feedwater Systems

a. Inspection Scope

The NRC issued IN 2007-18 to inform licensees of operating experience regarding possible entrainment of air or debris into AFW systems, potentially affecting the operability of these systems. The team reviewed Constellation's evaluation of the AFW system susceptibility to entrainment. Specifically, the team reviewed elevation drawings, and operating and maintenance procedures for the system to ensure that Constellation had taken proper actions to ensure the potential issues identified in the IN were addressed.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (IP 71152)

a. Inspection Scope

The team reviewed a sample of problems that Constellation had previously identified and entered into the corrective action program. The team reviewed these issues to verify an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions. In addition, corrective action CRs written on issues identified during the inspection were reviewed to verify adequate problem identification and incorporation of the problem into the corrective action system. The specific corrective action documents that were sampled and reviewed by the team are listed in the Attachment.

b. Findings

No findings were identified.

4OA5 Other Activities (IP 71111.21)

(Closed) Unresolved Item 05000317and 05000318/2011005-05, Single Failure Vulnerability for Low Pressure Safety Injection Flow Control Valve 2CV306

Description: On December 1, 2010, a technician inadvertently bumped his hardhat on the electro-pneumatic (I/P) converter for low pressure safety injection (LPSI) system flow control valve, 2CV306, during an adjacent instrument calibration activity. As a result of the mechanical agitation, 2CV306 moved from 100 percent open to 75 percent open.

Constellation determined that the impact to the I/P converter had caused a calibration "shift," which caused the valve to partially close. The valve is an air-operated valve (AOV), and is located on a pipe connecting both LPSI pumps to the LPSI injection header. The header then branches into four lines for emergency core cooling system injection into the reactor coolant system. The valve is designed to fail open on loss of air, but if it were to fail closed it would make both trains of LPSI inoperable. Therefore, this Unresolved Item was opened to determine if single failure vulnerabilities existed that could cause the valve to fail closed.

The team reviewed the electrical and mechanical design of the valve's control circuit and pneumatic controller to determine if an active mechanical or electrical failure, or if a passive electrical failure existed. The team also reviewed Constellation's evaluation of failure mechanisms for the valve. The team concluded that the installed valve configuration did meet the single failure requirements as described in the UFSAR. The team also reviewed the licensing documentation for the requirements to meet TS Surveillance Requirement (SR) 3.5.2.1, which requires operators to "verify the following valves are in the listed position with power to the valve operator removed." This surveillance applies to 2CV306. The team found that the correspondence between the NRC and the licensee did not specify the method to remove "power" from the AOV. Therefore, Constellation's practice of electrically isolating control power to the valve was not inconsistent with the licensing documents. Finally, the team reviewed Constellation's corrective actions associated with the issue (CR 2012-005390) and noted that following the event, Constellation closed the air supply valve to the 2CV306 and has taken steps to permanently reposition the air supply valve closed as the method of removing power to the valve operator. In particular, Constellation concluded that the method previously used to remove power to the valve did not meet the "plain language" intent of SR 3.5.2.1. In addition, as stated in the CR, Constellation plans to update the TS Basis for SR 3.5.2.1 to reflect the current practice of isolating the air supply valve to 2CV306. The team concluded that the removal of the motive force needed to reposition the valve closed was a more conservative approach to meeting TS SR 3.5.2.1, and eliminated all active and passive failures of the valve with the exception of a valve stem-disc separation. Based on this review, the team concluded that Constellation had taken appropriate corrective action and no performance deficiency was identified.

4OA6 Meetings, including Exit

The team presented the preliminary inspection results to Mr. C. Costanzo, Plant General Manager, and other members of Constellation staff at a meeting on June 21, 2012, and to Mr. G. Gellrich, Site Vice President, and members of the staff via teleconference on July 18, 2012. Following additional in-office review, the final inspection results were presented to Mr. G. Gellrich on August 22, 2012. The team reviewed proprietary information, which was returned to Constellation at the end of the inspection. The team verified that no proprietary information was documented in the report.

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Constellation Personnel

B. Bowen, Design Engineering
K. Bodine, Supervisor, Engineering
D. Burdin, System Engineering
G. Dare, System Engineering
A. Drake, Design Engineer
P. Furio, Engineering Analyst, Licensing
R. Gines, Senior Engineer
M. Khan, Design Engineering
T. Konerth, Design Engineer
S. Loeper, System Engineering
C. Neyman, Senior Engineering Analyst, Licensing
J. Sponsel, Design Engineer
R. Stark, Design Engineering

NRC Personnel
W. Schmidt, Senior Reactor Analyst
S. Kennedy, Senior Resident Inspector
E. Torres, Resident Inspector

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Open and Closed

05000317/2012007-01 05000318/2012007-01	NCV	Inadequate Cooling Verification for Containment Spray Pumps (Section 1R21.2.1.1)

Closed

05000317/2011005-05 05000318/2011005-05	URI	Single Failure Vulnerability for Low Pressure Safety Injection Flow Control Valve CV-306 (Section 4OA5)

LIST OF DOCUMENTS REVIEWED

Calculations and Engineering Evaluations

1LIA5610-01, 12 Condensate Storage Tank Low Level, Rev. 0001
4N63-M-01, ECCS Hydraulic Analysis, 4/22/92
52-10444, Containment Sump Recirculation 1MOV-4145, 104R MCC Setting Sheet, Rev. 4
C-013, Fuel Oil Storage Tank Seismic Outlier Resolution, 5/25/95
C-85-016, Intake Sluice Gate Retainer Clips, Rev. 0
C-85-039, Modification to Intake Structure Stop Gates, Rev. 0
C-92-189, Seismic Evaluation, EDG Buried Fuel Oil Supply Lines, Rev. 0
C-93-237, Structural Adequacy of Intake Structure Concrete Wall and Floor Slab, Rev. 0
CA00023, EDG Load Flow and Fault Calculation, Rev. 0
CA00067, EDG Fuel Oil Consumption Rate and Tank Capacity, Rev. 0
CA00782, Pipe Stress Analysis for CST-12, Vacuum Relief Vent Seismic Response, Rev. 0000
CA01064, Determination of AFW Inventory for Safe Shutdown Following an SSE for the Resolution of USI A-46, Rev. 0
CA01206, Safety-Related 4 kV Undervoltage Protection, Rev. 4
CA03385, Unit 1 Service Water Flow Analysis, Rev.1
CA03414, AFW Pumps-NPSH and Max Allowable Flows for Combination of AFW Pumps, Rev. 0
CA03548, System Level Design Basis Review for AOVs in the AFW System, Rev. 0
CA03742, Structural Evaluation of Block Wall A24, Auxiliary Building, Rev. 0
CA03745, Uncertainty Calculation for 12 CST Level, Rev. 0002
CA04079, Comparison of Available and Required NPSH for the Safety Injection and Containment Spray Pumps during Post-RAS Operation, Rev. 0
CA04113, Condensate and Demineralized Water Storage Tank Relief Valve Sizing, Rev. 9
CA04147, CST-11, 12 and 21 and DWST-11 Overflow Design, Rev 0000
CA04346, CST-12 Loop Seal and Vent Design, Rev. 0
CA04467, AFW Pump Room Transient Temperature Analysis under App. R Fire/non-LOOP, LOCA/LOOP, App. R Fire/LOOP and SBO using Gothic Code, Rev. 1
CA04765, Maximum Expected EDG Room (2A, 1B, and 2B) Temperatures during Accident Conditions with EDG Loaded to 3600 kW, Rev. 0
CA04879, SaltWater NPSH and Pressure Evaluation, Rev. 0
CA04944, Unit 2 Containment Spray Analysis, Rev. 0
CA04978, Vortexing Potential for AFW Pumps when Pumping from 12 CST, Rev. 1
CA06047, Revise Seismic Analysis for the AFW Pump (Steam Driven), Rev. 0
CA06299, Maximum Hypothetical Accident Using Alternate Source Term, Rev. 1
CA06774, Containment Response to DBAs for CCNPP Units 1 and 2, Rev. 2
CA07458, Analysis of Containment Sump to Hot and Cold Leg LOCA for CCNPP 1 and 2, Rev. 0
CA07772, AC Load Flow Study, Rev. 0
CA07791, AFW Pumps Minimum Total Developed Head Required, Rev. 0
CA4891, Evaluation of Vortexing in the RWT at RAS/Pre-RAS, and Resultant Void Fraction of Fluids Ingested by the ECCS Pumps, Rev. 1
CA64750, Evaluation of Vortexing in the RWT, and Resultant Void Fraction of Fluids Ingested by the ECCS Pumps during Post-RAS Operation, Rev. 2
CCNPP Substation Control Battery and Charger Sizing, 2/11/05

D-E-94-001, Relay Settings - DG1A, Rev. 4
D-E-94-001, Relay Settings and Coordination, Rev. 7
D-M-93-010, SBO Diesel Building Ventilation, Rev. 4
E-406, Engineering Design Standards, Cable Termination, Rev. 4
E-90-038, MOV Minimum Voltages Lasting Longer than 5 Seconds, Rev. 1
E-90-065, 4kV Bus 11 Protective Devices, Rev. 4
E-93-024, Coordination 120Vac Vital Instrument Buses, Rev. 1
ECP-10-000381, Protective Relay Setpoint Calculations for 4.16KV Breakers Bus 11, Rev. 4
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ES-001, Internal Plant Flooding Design Evaluation, Rev. 3
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M-85-012, CST-12 Temporary Sparger Vacuum and Relief, Rev. 0
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M-87-010, AFW Inventory Required to Maintain S/G Level and Hot Standby, Rev. 2
M-88-13, AFW and ECCS Recirculation (IE Bulletin 88-04), Rev. 0
M-90-191, Maximum Flood Height Resulting from Pipe Break in AFW Room, Rev. 0
M-90-192, Flood Height Resulting from Pipe Break in Intake Structure, Rev. 0
M-91-44, Velan Motor Operated Valve Maximum Thrust Calculation, Rev. 2

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* CR written as a result of this inspection

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Letter from BGE to NRC: IE Bulletin 88-04, 10/12/89
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12329C-0024, Condensate Storage Tank No. 12 Penetrations, Vent and Test Standpipe, Rev. 4
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12329C-20, Condensate Storage Tank No. 12 Roof Details, Rev. 1
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12617A-0005, Area 109 AFW Pump Suction, Rev. 7
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15382-0030, List of Material for Valve Only, Sh. 5, Rev. 8
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15382-0041, Type A-180-B-EX-29 Actuator View of Electrical Components, Sh. 15, Rev. 5
15382-0042, Rockwell A-180-B-EX-29 Actuator View of Tank, Sh. 16, Rev. 7
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15382-0047, Valve Limit Switch Diagram, Rev. 4
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60717, Well Water, Pretreated Water, DW and Condensate Storage System, Sh. 1, Rev. 100
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60722, Auxiliary Building Ventilation System, Sh. 2, Rev. 45
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61001, Electrical Main Single Line Diagram, FSAR Fig. No. 8-1, Sh. 1, Rev. 43
61004, Single Line Meter and Relay Diagram 13kV System, Rev. 26
61005, Meter and Relay Diagram 4kV System Unit Buses 11/14 FSAR Fig. No. 8-4, Rev. 36
61007, EDG Project Meter and Relay Diagram 4kV System Unit Bus 17, Sh. 1, Rev. 6
61009, Single Line 480Vac Unit Buses 11A, 11B, 14A and 14B, FSAR Fig. 8-3, Rev. 40
61010, EDG Project Meter and Relay Diagram 480Vac System Unit Bus 17, Sh.2, Rev. 3
61022, Single Line Diagram 120Vac Vital System, Sh. 1, Rev. 48
61042, AC Schematic Diagram 13kV Service Bus 11, Sh. 1, Rev. 15
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61058, Logic Diagram Engineered Safety Features Actuation System Unit 1, Rev. 36
61076, Reactor Safeguards Containment Sump Discharge Valves 1MOV4145, Sh. 3, Rev. 1
61080, Schematic Diagram Saltwater Pump 11, Sh. 6, Rev. 27
61416E, 500 kV Switchyard 125V DC Station Service Single-Line Diagram, Rev. 14
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61-832-E, Intake Structure Section and Details, Sh. 10, Rev. 9
62695, Loop Diagram LPSI Flow Control 2FT306, Sh. 62, Rev. 10

62731, Safety Injection and CS Systems, Sh. 1/2/3, Rev. 77/44/28
63059, Schematic Diagram Engineered Safety Features Actuation System, Rev. 23
63076, Reactor Safeguards Containment Sump Discharge Valve 2MOV4145, Sh. 30C, Rev. 1
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LIST OF ACRONYMS

°F	Degrees Fahrenheit
AC	Alternating Current
ADAMS	Agencywide Documents Access and Management System
AFW	Auxiliary Feedwater
AOV	Air-Operated Valve
CCNPP	Calvert Cliffs Nuclear Power Plant
CFR	Code of Federal Regulations
CR	Condition Report
CS	Containment Spray
CST	Condensate Storage Tank
DC	Direct Current
DG	Diesel Generator
DRS	Division of Reactor Safety
EDG	Emergency Diesel Generator
GDC	General Design Criterion
I/P	Electro-Pneumatic
IMC	Inspection Manual Chapter
IN	Information Notice
IP	Inspection Procedure
IST	In-Service Test
kV	Kilovolt
LERF	Large Early Release Frequency
LPSI	Low Pressure Safety Injection
MOV	Motor-Operated Valve
MSIV	Main Steam Isolation Valve
MSSV	Main Steam Safety Valve
NCV	Non-cited Violation
NRC	Nuclear Regulatory Commission
OE	Operating Experience
PRA	Probabilistic Risk Assessment
RAW	Risk Achievement Worth
RECO	Reasonable Expectation of Continued Operability
RRW	Risk Reduction Worth
SBO	Station Blackout
SDP	Significance Determination Process
SER	Safety Evaluation Report
SPAR	Standardized Plant Analysis Report
SR	Surveillance Requirement
SSC	Systems, Structures, and Components
SW	Saltwater
TDAFW	Turbine-Driven Auxiliary Feedwater
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
Vac	Volts, Alternating Current
Vdc	Volts, Direct Current